UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/390,255	09/03/1999	TINKU ACHARYA	INTL-0210-US	6618

7590 11/25/2003

TIMOTHY N TROP
TROP PRUNER HU & MILES PC
8554 KATY FREEWAY
SUITE 100
HOUSTON, TX 77024

EXAMINER	
JOHNSON, TIMOTHY M	
ART UNIT	**PAPER NUMBER**
2625	19

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/390,255	ACHARYA ET AL.	
	Examiner	Art Unit	
	Timothy M Johnson	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 16-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolarov et al., 6,144,773, in view of Zandi et al., 6,222,941.

As a general note to the claims, especially independent claims 16, 23, and 29, exemplary claim 29 recites (16 and 23 recite equivalent language) "for each said bit order, code the associated bits to indicate zerotree roots". One should not be confused into thinking that each bit order of the wavelet coefficients must or will indicate zerotree roots, because in zerotree coding, the zerotree root is only one type of attribute in zerotree coding. Thus, the claims should not be unnecessarily narrowly interpreted, for without a broad interpretation of these claims, there would clearly be enablement issues. See the Applicant's specification with respect to the different possible types of zerotree attributes in at least the first full paragraphs on pages 5-6.

For claim 29, a computer system comprising a processor and a memory storing a program to cause the processor perform wavelet compression is provided by Kolarov in at least the abstract for wavelet compression, and c. 7, line 34 – c. 8, line 27 for a processor and memory.

The wavelet compression of Kolarov provides for the claim as follows:

Kolarov provides wavelet coefficients that indicate an image in the third and fourth full paragraphs in c. 12, where Kolarov explicitly recites processing an image, and block 309 of Fig. 3a explicitly recites bitplanes, which is are what make up an image, and wavelet coefficients thereof is explicitly recited by Kolarov in at least block 320 in Fig. 3a. The bits of each wavelet coefficient being associated with a different bit order so that each bit order is associated with one of the bits of each wavelet coefficient is provided by Kolarov in at least c. 19, line 19 – c. 20, line 13, where it is clear that the bits of each wavelet coefficient are uniquely ordered by at least bitplane significance and each bitplane order is associated with one wavelet coefficient bit, and additionally by the significance function of Kolarov. See also c. 5, lines 19-41, of Kolarov for wavelet coefficients bits associated with a specific order, and also Zandi in at least the last full paragraph in c. 6 and in most of c. 16, where bits are and can be uniquely ordered not only by bitplanes.

For each said bit order, code the associated bits to indicate zerotree roots that are associated with the bit order is not explicitly recited by Kolarov, but Kolarov clearly does provide for coding associated bits for each bit order in at least Figs. 4a-4c and c. 20, line 14 – c. 21, line 33, where each bit, ordered by at least significance, is coded using an algorithm "analogous to Algorithm II of Said-Pearlman". The process of determining significance is a central part in determining zerotree attributes in any zerotree coding method. It is noted that this reference is incorporated by reference into Kolarov in the last full paragraph in c. 8, which is an extended technique of the zerotree

algorithm of Shapiro. Zandi also cites, similar to Kolarov, and uses a modification of the zerotree method of Shapiro in at least the fourth and fifth full paragraphs in c. 23. See at least the second and third full paragraphs in c. 23 of Zandi for the similarities of the zerotree attributes. Not only is Zandi considerably analogous to the Applicant's invention and Kolarov, Zandi further, like the Applicant and Kolarov, classifies zerotree attributes on a bit basis as considerably detailed in the previous Office actions, and again, for example, in at least the third full paragraph in c. 24, the paragraph bridging cols. 24-25, and the last full paragraph in c. 25, where Zandi clearly determines zerotree roots on a bit basis contrary to the Applicant's arguments. It would've been obvious to one having ordinary skill in the art at the time the invention was made to indicate zerotree roots, as taught by Zandi, with the zerotree compression of Kolarov, because it should be clear based on the above analysis that both Zandi and Kolarov rely on the basic zerotree coding algorithm, which determines, inter alia, zerotree roots, and further because Zandi offers many advantages, such as "efficiently" coding the significance data with the zerotree method (c. 23, second full paragraph), "an ordering which preserves the tree structure is fixed and used consistently" (c. 24, second full paragraph), coding based on bit significance, and further provides for a termination test for determining whether a desired compression ratio is reached in the first full paragraph in c. 25.

For claim 30, wherein each bit order is associated with only one of the bits of each wavelet coefficient is clearly provided from the rejection above, where the orders of at least bitplanes are distinct.

For claim 31, determining which of the bits indicate zeros is provided by both Kolarov and Zandi where cited above, and classifying each zero as either an isolated zero or a zerotree root is considered implicitly provided by Kolarov, and explicitly by Zandi where cited above.

For claim 32, wherein some of the wavelet coefficients are descendants of some of the other wavelet coefficients is already provided by the zerotree concept and explicitly by Kolarov in at least the last full paragraph in c. 19, and also by Zandi where cited above, and wherein the processor determines which of the bits are zeros by traversing a descendant tree from a bit associated with one of the some of the wavelet coefficients to bit associated with the other wavelet coefficients to locate the zerotree root is indicated by Kolarov above, where each bit is tested for significance, which is basic concept in zerotree coding to determine zerotree attributes. See also the rejection above with respect to Zandi, who explicitly provides for the zerotree roots, and traverses the tree with respect to bits, and see Zandi also in at least the paragraph bridging cols. 22-23, the second full paragraph in c. 24 and the last two full paragraphs in c. 24, where it should be clear that the tree is traversed, since the children are determined for

significance only after the parents (i.e. tree traversal) as is part of conventional zerotree coding.

For claim 33, providing the wavelet coefficients by producing different levels of the code, each level being associated with a different reference of the image is basically provided by the concept of the wavelet transform simply illustrated by Kolarov in at least the third full paragraph in c. 9. It is noted that Kolarov uses a modified tree of coefficients in block 362 in Fig. 3b, but it is still a tree, and therefore hierarchical in resolution, as indicated in at least the last two full paragraphs in c. 17. Zandi was used above for the explicit recitation of zerotree roots, and also produces, inter alia, zerotree root attributes as part of the wavelet codes, and it is clear that these codes cover different resolutions, since the wavelet coefficient tree is coded using the parent root down in resolution to the children/descendents where cited above.

For claim 16, see the rejection of at least claim 29.

For claims 17 and 23-24, see the rejection of at least claim 30.

For claims 18 and 25, see the rejection of at least claim 31.

For claims 19 and 26, see the rejection of at least claim 32.

For claims 20 and 27, see the rejection of at least claim 33.

For claims 21 and 28, wherein the levels that are associated with lower resolution are associated with higher orders is understood provided by the hierarchical concept

indicated in at least the third full paragraph in c. 9 of Kolarov, because the coarse, i.e. lower resolution, is associated at the highest level or order in the tree, while the finer resolutions are associated with the lower levels in the tree. See also Zandi in at least the last full paragraph in c. 14 for the same well known concept.

For claim 22, providing wavelet coefficients comprises providing intensity level coefficients that indicate pixel intensities of the image is clearly provided by Kolarov in at least the first and fourth through the last full paragraphs in c. 12, which indicate different an image as an example, where color/gray scale for example provide for intensity levels of pixels. Transforming the intensity level coefficients into wavelet subbands is provided by Kolarov in at least the second through the fourth full paragraphs in c. 13, for the wavelet transform, and subbands are explicitly recited for example in the first and second full paragraphs in c. 16 with reference to HH or HL for example, which are specific subbands. See also at least c. 14, lines 15-64 of Zandi, where subbands are explicitly recited.

Response to Amendment

3. The objection to claim 24 and the 112/2 rejection of claims 16-33 have been overcome by amendment.

4. Applicant's arguments filed August 11, 2003 have been fully considered but they are not persuasive.

The Applicant argues on pages 6-8 of the amendment that neither Zandi nor Kolarov teach coding bits, associated with bit orders, to indicate zerotree roots associated with the bit order, since Kolarov codes entire multiple bit wavelet coefficients for zerotree roots, not for each bit order, and because Zandi zerotree codes on a coefficient basis.

The Examiner respectfully disagrees. Kolarov explicitly provides for coding wavelet coefficients consisting of individual bits, such bits corresponding to bit orders, where each bit of each wavelet coefficient is processed, and not jus the wavelet coefficient as a whole. See the rejections above where Kolarov is cited. Zandi similarly provide for bits associated with bit orders in at least c. 6, lines 40-58, and which bits are encoded to indicate at least zerotree roots associated with the order in at least c. 23, line 19 – c. 24, line 31.

Final

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy M. Johnson whose telephone number is (703) 306-3096, or the Supervisory Patent Examiner, Bhavesh M. Mehta, whose telephone number is (703) 308-5246.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703) 305-4700, (703) 305-4750, (703) 305-9600, or (703) 305-3800, or Customer Service at (703) 306-0377.

The Group Art Unit FAX number is 703-872-9306.

Timothy M. Johnson
Patent Examiner
Art Unit 2625
November 23, 2003

Timothy M. Johnson
TIMOTHY M. JOHNSON
PRIMARY EXAMINER